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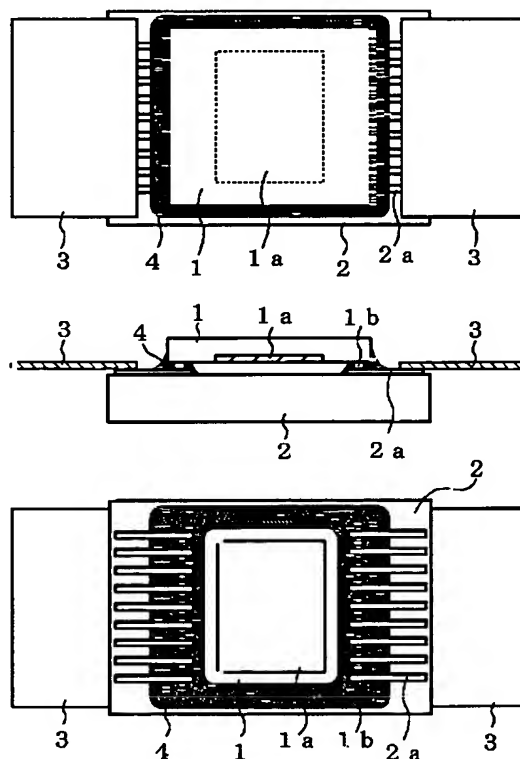
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(54) 【発明の名称】 イメージセンサ IC パッケージおよびその製造方法

(57) 【要約】

【課題】小型化が可能なイメージセンサ IC パッケージおよびその製造方法を提供することを目的とする。

【解決手段】ガラス基板上に透明導体パターンを形成し、該透明導体パターンのイメージセンサ IC 実装用電極部と入出力端子部には金めっきを施し、イメージセンサ IC を前記ガラス基板上にフリップチップ実装し、チップ周辺を樹脂で封止し、入出力端子部にはフレキシブルプリント配線板を実装する。



【特許請求の範囲】

【請求項1】 ガラス基板上のIC実装用電極にフリップチップ実装したイメージセンサICのチップ周辺を樹脂封止し、前記ガラス基板上の入出力端子にフレキシブルプリント配線板を接続した構造を有することを特徴とするイメージセンサICパッケージ。

【請求項2】 ガラス基板上に導体パターンを形成し、該導体パターンの内少なくともイメージセンサIC実装用電極部および入出力端子部には金めっきを施し、イメージセンサICの電極には金バンパを形成し、該イメージセンサICを前記ガラス基板のイメージセンサIC実装用電極部に位置決め載置してフリップチップ実装し、チップ周辺を樹脂で封止し、前記ガラス基板の入出力端子部にフレキシブルプリント配線板を圧接実装することを特徴とするイメージセンサICパッケージの製造方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明はイメージセンサICパッケージに係り、特にCOG（チップ・オン・ガラス）工法を用いたイメージセンサICパッケージおよびその製造方法に関するものである。

【0002】

【従来の技術】近年の電子部品の発達と画像処理技術や伝送技術の向上により、小型イメージセンサの需要が高まっている。従来の小型イメージセンサICパッケージは一般に図2に示す構造を有している。図2において、21はイメージセンサIC、21aはイメージセンサIC21のイメージセンサ部、21bはイメージセンサIC21の電極、22はセラミックヘッダー、22aはセラミックヘッダー22のキャビティ内電極、23はワイヤボンディングによる配線、24はガラス製のふたである。セラミックヘッダー22内にイメージセンサIC21をダイマウントし、ワイヤボンディングでキャビティ内の電極22aと接続していた。また、セラミックヘッダー22にガラス製のふた24を接着剤にて固着し封止する構造になっている。

【0003】

【発明が解決しようとする課題】しかしながら、パッケージ外形寸法は面積がイメージセンサICチップの約6倍、高さがイメージセンサICチップの数倍と大きく、したがって、撮像モジュール外形が大きくなってしまい、装置の形状を小型化する上での障害になるという問題があった。本発明は、上記課題を解決するためになされたもので、小型化が可能なイメージセンサICパッケージを提供することを目的とする。

【0004】

【課題を解決するための手段】請求項1のイメージセンサICパッケージは、ガラス基板上のIC実装用電極にフリップチップ実装したイメージセンサICのチップ周

辺を樹脂封止し、前記ガラス基板上の入出力端子にフレキシブルプリント配線板を接続した構造を有することを特徴とする。

【0005】請求項2のイメージセンサICパッケージの製造方法は、ガラス基板上に導体パターンを形成し、該導体パターンの内少なくともイメージセンサIC実装用電極部および入出力端子部には金めっきを施し、イメージセンサICの電極には金バンパを形成し、該イメージセンサICを前記ガラス基板のイメージセンサIC実装用電極部に位置決め載置してフリップチップ実装し、チップ周辺を樹脂で封止し、前記ガラス基板の入出力端子部にフレキシブルプリント配線板を圧接実装することを特徴とする。

【0006】上記のイメージセンサICパッケージによれば、セラミックヘッダーを使用すること無く、ワイヤボンディングによる配線も不要のCOG工法によるパッケージが得られるので、小型、軽量の電子機器設計に有利なイメージセンサICパッケージを提供することができ

【0007】

【発明の実施の形態】以下、本発明の一実施形態について図面を参照して説明する。図1は、本発明の具体的実施例であるCOG工法によるイメージセンサICパッケージを模式図で示す。図1において、1はイメージセンサIC、1aはイメージセンサIC1のイメージセンサ部、1bはイメージセンサIC1の金バンパ、2はガラス基板、2aはガラス基板2上のパターン、3は外部回路へ接続するためのフレキシブルプリント配線板、4はアンダーフィル樹脂を示す。

【0008】ガラス基板2上に形成するパターン2aは、液晶表示装置の表示画素用電極を形成する方法を適用する。例えば、ガラス基板2に、スパッタリング法により、ITO（酸化インジウム錫）透明電極膜を形成し、パターン2a部以外をめっきレジストで覆い、パターン2a部に電解または無電解金めっきを施す。めっきレジスト剥離後、ITO透明電極膜をエッチングすることで所望のパターン2aを得る。このパターン2a形成に先立ち、ガラス基板2のイメージセンサ部1aに対向する部分をマスキングし、失透を防ぐことが重要である。

【0009】前記パターン2a形成済みのガラス基板2上の前記実装用電極上に、金バンパ1bを形成したイメージセンサIC1のフリップチップ実装を行なうが、このフリップチップ実装には、超音波工法や圧接工法がある。

【0010】超音波工法による場合は、接合部位を加熱しながら加圧し、超音波振動を加えることでイメージセンサIC1の金バンパ1bとガラス基板2のイメージセンサIC実装用電極部との接合を行なう。接合完了後、イメージセンサIC1の周辺に熱硬化型あるいは紫外線

硬化型の樹脂4を塗布することで、塵埃や湿気からイメージセンサ部1aを保護する封止効果、イメージセンサへの邪魔な光の進入を防ぐ遮光効果、イメージセンサIC1とガラス基板との接続信頼性向上のアンダーフィル効果を持たせる。

【0011】圧接工法による場合は、導電性粒子無しの透明樹脂をガラス基板2へ塗布し、イメージセンサIC1の金バンパ1bとガラス基板2のイメージセンサIC実装用電極部の位置合わせをしてイメージセンサIC1を圧接し、前記樹脂を加熱して硬化することで接続を図る。この場合には、該透明樹脂により既に封止効果とアンダーフィル効果がそなわっているため、単に遮光効果を持たせるための樹脂塗布を追加するだけでよい。

【0012】外部端子とフレキシブルプリント配線板3の接続は、例えばACF（異方性導電フィルム）あるいはNCF（非導電性フィルム）を用いて圧着実装を行なう。

【0013】

【発明の効果】本発明によれば、イメージセンサICをガラス基板に直接フリップチップ実装し、同ガラス基板の入出力端子にフレキシブルプリント配線板を圧着実装するので、従来ヘッダに施したキャビティやワイヤボンディング電極、ワイヤボンディング配線等の余分な配線

やスペースが不要になり、小型化、軽量化が図れる。また、配線経路が短くなるため、信号の伝送にあたってノイズを低減することができる。

【図面の簡単な説明】

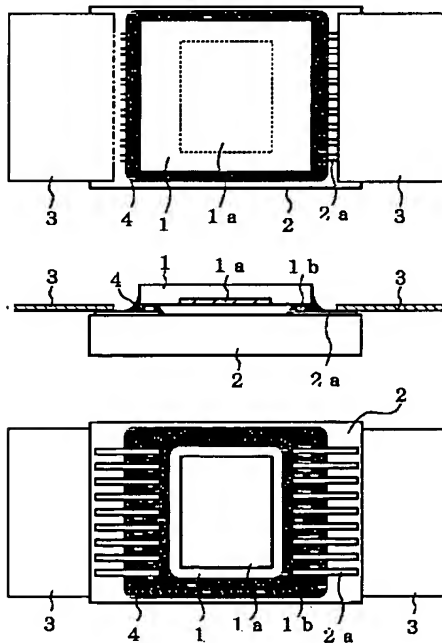
【図1】本発明の1実施の形態であるイメージセンサICのパッケージ模式図である。

【図2】従来の小型イメージセンサICパッケージ模式図である。

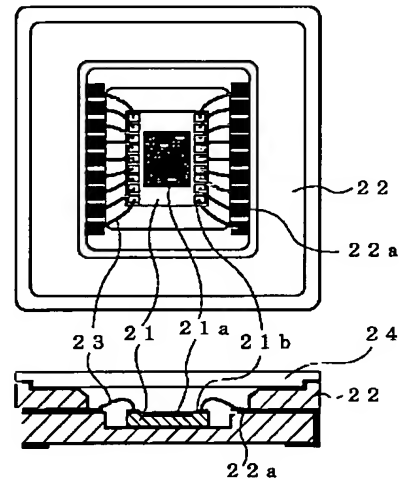
【符号の説明】

- 1 イメージセンサIC
- 1a イメージセンサIC1のイメージセンサ部
- 1b イメージセンサIC1の金バンパ
- 2 ガラス基板
- 2a ガラス基板2上のパターン
- 3 フレキシブルプリント配線板
- 4 アンダーフィル樹脂
- 21 イメージセンサIC
- 21a イメージセンサIC21のイメージセンサ部
- 21b イメージセンサIC21の電極
- 22 セラミックヘッダー
- 22a セラミックヘッダー22のキャビティ内電極
- 23 ワイヤボンディングによる配線
- 24 ガラス製のふた

【図1】



【図2】



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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the package mimetic diagram of the image sensors IC which are the gestalten of 1 operation of this invention.

[Drawing 2] It is the conventional small image-sensors IC package mimetic diagram.

[Description of Notations]

1 Image Sensors IC

1a The image-sensors section of image sensors IC 1

1b The golden bump of image sensors IC 1

2 Glass Substrate

2a The pattern on a glass substrate 2

3 Flexible Printed Wiring Board

4 Under-filling Resin

21 Image Sensors IC

21a The image-sensors section of image sensors IC 21

21b The electrode of image sensors IC 21

22 Ceramic Header

22a The electrode in a cavity of the ceramic header 22

23 Wiring by Wirebonding

24 Glass Cover

[Translation done.]

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MEANS

[Means for Solving the Problem] The image-sensors IC package of claim 1 carries out the resin seal of the chip circumference of the image sensors IC which carried out flip chip mounting to the electrode for IC mounting on a glass substrate, and is characterized by having the structure which connected the flexible printed wiring board to the input/output terminal on said glass substrate.

[0005] The manufacture approach of the image-sensors IC package of claim 2 Form a conductor pattern on a glass substrate and it plates with gold among these conductor patterns at least at the polar zone for image-sensors IC mounting, and the input/output terminal section. Form a golden bump in the electrode of image sensors IC, and carry out positioning installation of these image sensors IC at the polar zone for image-sensors IC mounting of said glass substrate, and flip chip mounting is carried out. The chip circumference is closed by resin and it is characterized by carrying out pressure-welding mounting of the flexible printed wiring board at the input/output terminal section of said glass substrate.

[0006] Since the package by the COG method of construction also with unnecessary wiring by wirebonding is obtained according to the above-mentioned image-sensors IC package, without using a ceramic header, an image-sensors IC package advantageous to a small and lightweight electronic equipment design can be offered.

[0007]

[Embodiment of the Invention] Hereafter, 1 operation gestalt of this invention is explained with reference to a drawing. Drawing 1 shows the image-sensors IC package by the COG method of construction which is the concrete example of this invention by the mimetic diagram. In drawing 1, 1 shows a flexible printed wiring board to connect a glass substrate and 2a to the pattern on a glass substrate 2, and for the golden bump of image sensors IC 1 and 2 connect [image sensors IC and 1a] 3 to an external circuit in the image-sensors section of image sensors IC 1, and 1b, and 4 shows under-filling resin.

[0008] Pattern 2a formed on a glass substrate 2 applies the approach of forming the electrode for display pixels of a liquid crystal display. For example, by the sputtering method, the ITO (indium oxide tin) transparent electrode film is formed in a glass substrate 2, it covers except the pattern 2a section to it by plating resist, and electrolysis or non-electrolyzed gilding is given to it at the pattern 2a section. Desired pattern 2a is obtained by etching the ITO transparent electrode film after plating-resist exfoliation. It is important to mask the part which counters image-sensors section 1a of a glass substrate 2 in advance of this pattern 2a formation, and to prevent devitrification.

[0009] Although flip chip mounting of the image sensors IC 1 in which golden bump 1b was formed on said electrode for mounting on the glass substrate [finishing / said pattern 2a formation] 2 is performed, there are an ultrasonic method of construction and a pressure-welding method of construction in this flip chip mounting.

[0010] When based on an ultrasonic method of construction, it pressurizes heating at least a joint and junction to golden bump 1b of image sensors IC 1 and the polar zone for image-sensors IC mounting of a glass substrate 2 is performed by adding supersonic vibration. The closure effectiveness of protecting image-sensors section 1a from dust or moisture, the protection-from-light effectiveness which prevents penetration of an obstructive light to image sensors, and the under-filling effectiveness of the improvement in connection dependability of image sensors IC 1 and a glass substrate are given by applying the resin 4 of a heat-curing mold or an ultraviolet curing mold after the completion of junction, and on the outskirts of image sensors IC 1.

[0011] When based on a pressure-welding method of construction, transparence resin without a conductive particle is applied to a glass substrate 2, alignment of the polar zone for image-sensors IC mounting of a glass substrate 2 is set to golden bump 1b of image sensors IC 1, the pressure welding of the image sensors IC 1 is carried out, and connection is aimed at by heating and hardening said resin. In this case, what is necessary is just to add resin spreading for only giving the protection-from-light effectiveness, since the closure effectiveness and the under-filling effectiveness are already equipped with this transparence resin.

[0012] Connection of an external terminal and a flexible printed wiring board 3 performs sticking-by-pressure mounting using ACF (anisotropy electric conduction film) or NCF (non-conductive film).

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, the package dimension had the problem of about 6 times of an image-sensors IC chip and height having had an area as large as several times of an image-sensors IC chip, therefore an image pick-up module appearance having become large, and becoming a failure when the configuration of equipment is miniaturized. This invention was made in order to solve the above-mentioned technical problem, and it aims at offering the image-sensors IC package which can be miniaturized.

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EFFECT OF THE INVENTION

[Effect of the Invention] Since according to this invention direct flip chip mounting of the image sensors IC is carried out at a glass substrate and sticking-by-pressure mounting of the flexible printed wiring board is carried out at the input/output terminal of this glass substrate, excessive wiring and tooth spaces, such as a cavity conventionally given to the header, and a wirebonding electrode, wirebonding wiring, become unnecessary, and miniaturization and lightweightization can be attained. Moreover, since a wiring path becomes short, a noise can be reduced in transmission of a signal.

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PRIOR ART

[Description of the Prior Art] The need of small image sensors is increasing by development of electronic parts in recent years, and improvement in an image processing technique or a transmission technique. The conventional small image-sensors IC package has the structure generally shown in drawing 2 . Setting to drawing 2 , 21 is wiring according [accord / a ceramic header and 22a / the electrode in a cavity of the ceramic header 22 / a / image sensors IC and / 21/ b / the image-sensors section of image sensors IC 21, and / 21/ 23] to wirebonding in the electrode of image sensors IC 21, and 22, and a cover glass in 24. Die mounting of the image sensors IC 21 was carried out into the ceramic header 22, and it had connected with electrode 22a in a cavity by wirebonding. Moreover, it has structure which fixes and closes the glass cover 24 with adhesives to the ceramic header 22.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to an image-sensors IC package, especially relates to the image-sensors IC package using a COG (chip-on glass) method of construction, and its manufacture approach.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to an image-sensors IC package, especially relates to the image-sensors IC package using a COG (chip-on glass) method of construction, and its manufacture approach.

[0002]

[Description of the Prior Art] The need of small image sensors is increasing by development of electronic parts in recent years, and improvement in an image processing technique or a transmission technique. The conventional small image-sensors IC package has the structure generally shown in drawing 2. Setting to drawing 2, 21 is wiring according [accord / a ceramic header and 22a / the electrode in a cavity of the ceramic header 22 / a / image sensors IC and / 21/ b / the image-sensors section of image sensors IC 21, and / 21/ 23] to wirebonding in the electrode of image sensors IC 21, and 22, and a cover glass in 24. Die mounting of the image sensors IC 21 was carried out into the ceramic header 22, and it had connected with electrode 22a in a cavity by wirebonding. Moreover, it has structure which fixes and closes the glass cover 24 with adhesives to the ceramic header 22.

[0003]

[Problem(s) to be Solved by the Invention] However, the package dimension had the problem of about 6 times of an image-sensors IC chip and height having had an area as large as several times of an image-sensors IC chip, therefore an image pick-up module appearance having become large, and becoming a failure when the configuration of equipment is miniaturized. This invention was made in order to solve the above-mentioned technical problem, and it aims at offering the image-sensors IC package which can be miniaturized.

[0004]

[Means for Solving the Problem] The image-sensors IC package of claim 1 carries out the resin seal of the chip circumference of the image sensors IC which carried out flip chip mounting to the electrode for IC mounting on a glass substrate, and is characterized by having the structure which connected the flexible printed wiring board to the input/output terminal on said glass substrate.

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[0007]

[Embodiment of the Invention] Hereafter, 1 operation gestalt of this invention is explained with reference to a drawing. Drawing 1 shows the image-sensors IC package by the COG method of construction which is the concrete example of this invention by the mimetic diagram. In drawing 1, 1 shows a flexible printed wiring board to connect a glass substrate and 2a to the pattern on a glass substrate 2, and for the golden bump of image sensors IC 1 and 2 connect [image sensors IC and 1a] 3 to an external circuit in the image-sensors section of image sensors IC 1, and 1b, and 4 shows under-filling resin.

[0008] Pattern 2a formed on a glass substrate 2 applies the approach of forming the electrode for display pixels of a liquid crystal display. For example, by the sputtering method, the ITO (indium oxide tin) transparent electrode film is formed in

a glass substrate 2, it covers except the pattern 2a section to it by plating resist, and electrolysis or non-electrolyzed gilding is given to it at the pattern 2a section. Desired pattern 2a is obtained by etching the ITO transparent electrode film after plating-resist exfoliation. It is important to mask the part which counters image-sensors section 1a of a glass substrate 2 in advance of this pattern 2a formation, and to prevent devitrification.

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[0011] When based on a pressure-welding method of construction, transparence resin without a conductive particle is applied to a glass substrate 2, alignment of the polar zone for image-sensors IC mounting of a glass substrate 2 is set to golden bump 1b of image sensors IC 1, the pressure welding of the image sensors IC 1 is carried out, and connection is aimed at by heating and hardening said resin. In this case, what is necessary is just to add resin spreading for only giving the protection-from-light effectiveness, since the closure effectiveness and the under-filling effectiveness are already equipped with this transparence resin.

[0012] Connection of an external terminal and a flexible printed wiring board 3 performs sticking-by-pressure mounting using ACF (anisotropy electric conduction film) or NCF (non-conductive film).

[0013]

[Effect of the Invention] Since according to this invention direct flip chip mounting of the image sensors IC is carried out at a glass substrate and sticking-by-pressure mounting of the flexible printed wiring board is carried out at the input/output terminal of this glass substrate, excessive wiring and tooth spaces, such as a cavity conventionally given to the header, and a wirebonding electrode, wirebonding wiring, become unnecessary, and miniaturization and lightweightization can be attained. Moreover, since a wiring path becomes short, a noise can be reduced in transmission of a signal.

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CLAIMS

[Claim(s)]

[Claim 1] The image-sensors IC package which carries out the resin seal of the chip circumference of the image sensors IC which carried out flip chip mounting to the electrode for IC mounting on a glass substrate, and is characterized by having the structure which connected the flexible printed wiring board to the input/output terminal on said glass substrate.

[Claim 2] The manufacture approach of the image-sensors IC package which forms a conductor pattern on a glass substrate, plates with gold among these conductor patterns at least at the polar zone for image-sensors IC mounting, and the input/output terminal section, forms a golden bump in the electrode of image sensors IC, carries out positioning installation of these image sensors IC at the polar zone for image-sensors IC mounting of said glass substrate, carries out flip chip mounting, closes the chip circumference by resin and is characterized by to carry out pressure-welding mounting of the flexible printed wiring board at the input/output terminal section of said glass substrate.

[Translation done.]